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SUBJECT: FABRY-PEROT DIAMETERS
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FABRY-PEROT DIAMETERS

This is a quick note to remind myself of how to determine the requisite diameter ϕ_{FP} for a Fabry-Perot. In order to maintain spectral purity, the beam angles at the Fabry-Perot (assumed to be at a pupil stop) must fall within the central bulls-eye of the interference fringes. This constraint is:

$\theta_{FP} = \sqrt{8/R}$ for a Fabry-Perot of resolution R and beam angle θ_{FP}.

To relate this to the telescope, since throughput is conserved, $\theta_{sky} \cdot \phi_{primary} = \theta_{FP} \cdot \phi_{FP}$. Substituting for SOFIA and using convenient units (θ_{sky} in arcseconds, ϕ_{FP} in mm) yields:

$$R \le \left(230 \frac{\phi_{FP}}{\theta_{sky}} \right)^2$$ (n.b.: for SOFIA only; for the CSO, reduce R by a factor of 16).

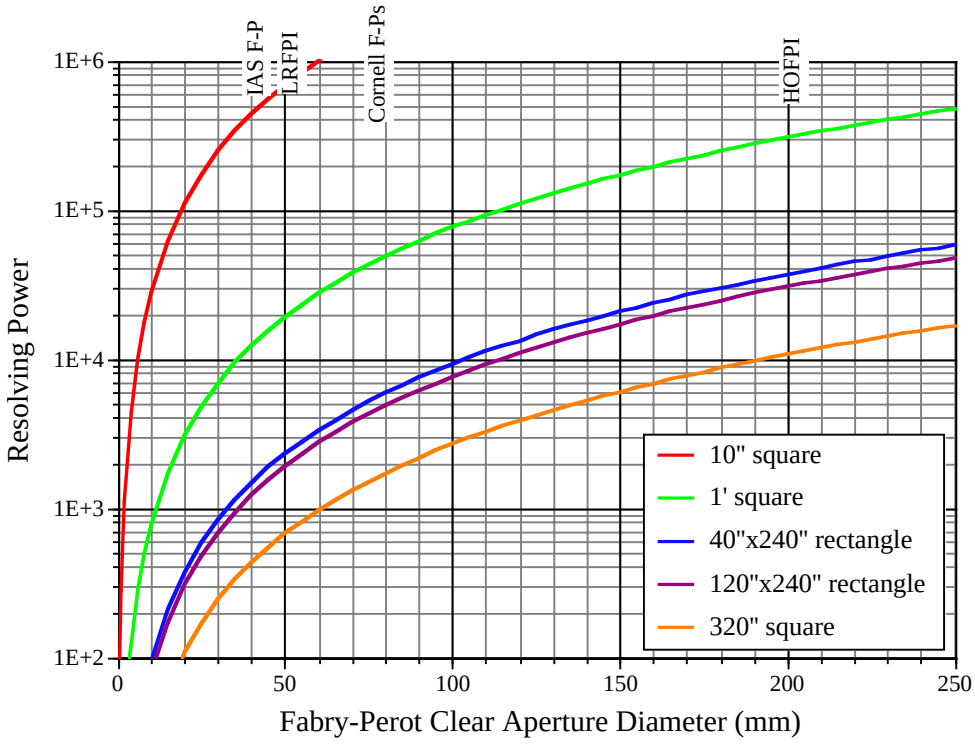

FIGURE 1. Resolving power vs. aperture diameter for a variety of field sizes.